WHAT IS CLAIMED IS:

1. A dual-mode spacecraft thruster comprising:

a thruster body containing a solid propellant, and having a combustion region adjacent to said solid propellant and a nozzle region adjacent to said combustion region, wherein the propellant ignites to produce a thrust only with the application of electrical power to the solid propellant;

a source of electrical power in electrical communication with said solid propellant through a primary electrode, said primary electrode being disposed within the combustion region of the thruster body;

a secondary electrode disposed within the nozzle region in electrical communication with said electrical power source; and

a control system for controlling the application of the electrical power, wherein the control system is adapted to switch the thruster between a high-thrust mode wherein only the primary electrode is operated to combust the solid propellant, and a high-exhaust-velocity mode wherein first the primary electrode is triggered to atomize the propellant and then the secondary electrode is triggered to ionize and accelerate the atomize propellant.

2. The dual-mode thruster of claim 1 wherein the electrical power to the secondary electrode is provided by a high voltage intermediate energy storage device.

3. The dual-mode thruster as described in claim 1, wherein the magnitude of the thrust in the high-thrust mode is dependent on the magnitude of the electrical power applied to the solid propellant.

4. The dual-mode thruster as described in claim 1, wherein the thrust is maintained only with the continued application of the electrical power to the solid propellant.

5. The dual-mode thruster as described in claim 1, wherein the solid propellant thruster is capable of a plurality of start/stop/restart cycles.

6. The dual-mode thruster as described in claim 1, wherein the solid propellant is a solid solution propellant.

7. The dual-mode thruster as described in claim 1, wherein the primary electrode comprises at least two primary electrodes to provide electrical communication from the source to the solid propellant.

8. The dual-mode thruster as described in claim 1, wherein the thruster body further comprises a feeder mechanism to ensure continuous contact between the primary electrode and the solid propellant.

9. The dual-mode thruster as described in claim 8, wherein the solid propellant is moveable relative to the primary electrode, which is fixed and the feeder mechanism is a resilient member in contact with the solid propellant such that the solid propellant is maintained in continuous electrical communication with the primary electrode.

10. The dual-mode thruster as described in claim 8, wherein the electrode is moveable relative to the solid propellant, which is fixed and the feeder mechanism is a resilient member in contact with the primary electrode such that the primary electrode is maintained in continuous electrical communication with the solid propellant.

11. The dual-mode thruster as described in claim 1, wherein either or both of the primary electrode and secondary electrodes are made of a material selected from the group consisting of: metals, metal alloys, carbon, and conductive ceramics.

12. The dual-mode thruster as described in claim 1, wherein either or both of the primary electrode and secondary electrodes are made of one of either aluminum or copper.

13. The dual-mode thruster as described in claim 1, wherein the solid propellant has a body defining an axis disposed between an end face and a combustion face, and wherein the combustion face is aligned parallel to the thrust.

14. The dual-mode thruster as described in claim 13, wherein the body of the solid propellant has either a square or circular cross-section.

15. The dual-mode thruster as described in claim 1, wherein the primary electrode is positioned a fixed distance away from the solid propellant.

16. The dual-mode thruster as described in claim 13, wherein the thruster comprises at least two primary electrodes positioned orthogonal to the solid propellant at a fixed distance on opposite sides of the combustion face of the solid propellant.

17. The dual-mode thruster as described in claim 13, wherein the thruster comprises a parallel row of a plurality of primary electrodes positioned orthogonal to the solid propellant arranged at fixed distances across the combustion face of the solid propellant.

18. The dual-mode thruster as described in claim 13, wherein the thruster comprises at least two primary electrodes disposed on the combustion face of the solid propellant.

19. The dual-mode thruster as described in claim 18, wherein the at least two primary electrodes are cylindrical.

20. The dual-mode thruster as described in claim 18, wherein the at least two primary electrodes comprise interlocking bars containing at least one right angle.

21. The dual-mode thruster as described in claim 13, wherein the thruster comprises at least two coaxial cylindrical primary electrodes arranged on the combustion face of the solid propellant.

22. The dual-mode thruster as described in claim 13, wherein the thruster comprises at least two primary electrodes, where a first primary electrode is disposed at the combustion face and where at least one second primary electrode is disposed along the body of the solid propellant.

23. The dual-mode thruster as described in claim 22, wherein the first primary electrode comprises a cylinder having at least one passage therethrough along the axis of said cylinder, and wherein the at least two second primary electrodes are disposed along at least two outer surfaces of the body of the solid propellant a fixed distance from said first primary electrode.

24. The dual-mode thruster as described in claim 22, wherein the thruster further comprises a third cylindrical primary electrode disposed within the body parallel to the axis of the solid propellant.

25. The dual-mode thruster as described in claim 13, wherein the thruster comprises at least two primary electrodes, where a first primary electrode is disposed at the combustion face and where at least one second cylindrical primary electrode is disposed within the body of the solid propellant along the axis of said solid propellant.

26. The dual-mode thruster as described in claim 25, wherein the thruster comprises at least two second cylindrical primary electrodes.

27. The dual-mode thruster as described in claim 13, wherein the thruster comprises at least one cylindrical primary electrode having at least one passage therethrough disposed on the end face of the solid propellant and at least one cylindrical

primary electrode having at least one passage therethrough disposed on the combustion face of the solid propellant.

28. The dual-mode thruster as described in claim 13, comprising at least first and second primary electrodes arranged such that the solid propellant is introduced into an electrode region between the first primary electrode and the second primary electrode in a non-parallel fashion relative to the thrust.

29. The dual-mode thruster as described in claim 13, wherein the solid propellant is ignited at an end face.

30. The dual-mode thruster as described in claim 13, wherein the solid propellant is ignited within the body of the solid propellant.

31. The dual-mode thruster as described in claim 1, wherein the electrical power is selected from the group consisting of alternating current, direct current, and capacitive discharge.

32. The dual-mode thruster as described in claim 2, wherein the high voltage intermediary energy storage device is a capacitor.

33. The dual-mode thruster as described in claim 1, wherein the source of electrical power further comprises a power processing unit adapted to control the flow of electrical power to the primary and secondary electrodes based on the mode of thrust.

34. The dual-mode thruster as described in claim 1, wherein in the high thrust mode the thruster produces a thrust exhaust velocity in the range of about 2500 m/s to 3000 m/s.

35. The dual-mode thruster as described in claim 1, wherein in the high exhaust velocity mode the thruster produces a thrust exhaust velocity in the range of about 10,000 – 30,000 km/s.

36. A method of producing thrust in a solid propellant thruster comprising:

providing a thruster body containing a solid propellant, and having a combustion region adjacent to said solid propellant and a nozzle region adjacent to said combustion region, wherein the propellant ignites to produce a thrust only with the application of electrical power to the solid propellant;

connecting a source of electrical power with said solid propellant through a primary electrode, said primary electrode being disposed within the combustion region of the thruster body;

connecting the source of electrical power to a secondary electrode disposed within the nozzle region in electrical communication with said electrical power source; and

controlling the application of the electrical power, such that in a high-thrust mode electrical power is only supplied to the primary electrode to initiate combustion of the solid propellant, and such that in a high-exhaust-velocity mode electrical power is first supplied to the primary electrode to atomize the propellant and then to the secondary electrode to ionize and accelerate the atomize propellant.